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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF	:
HANS-JOACHIM HAEHNLE, ET AL.	: EXAMINER: CORDRAY, D.R.
SERIAL NO: 10/581,459	:
FILED: JUNE 1, 2006	: GROUP ART UNIT: 1741

FOR: FILLER-CONTAINING PAPER AND A METHOD FOR THE PRODUCTION OF FILLER-CONTAINING PAPER

APPEAL BRIEF

This is an appeal to the Board of Patent Appeals and Interferences (Board) under 35 U.S.C. § 134 from the October 27, 2010, final rejection of Claims 4 and 6-11 of Application 10/581,459, filed June 1, 2006. A Notice of Appeal was timely filed on February 28, 2011, with one extension of time. This Appeal Brief is timely filed on April 28, 2011, with no extension of time.

REAL PARTY IN INTEREST

The real parties in interest in this appeal are BASF Aktiengesellschaft, Ludwigshafen, GERMANY 67056; and SEIKO PMC CORPORATION, having an address of 3-6, Nihonbashi Honcho 3-chome, Chuo-Ku, Tokyo, JAPAN.

RELATED APPEALS AND INTERFERENCES

Appellant/Applicant, Appellant/Applicant's legal representatives, and Appellant/Applicant's assignees, are aware of no appeals, interferences, or judicial proceedings that are related to, directly affect or would be directly affected by, or have a bearing on the decision of the Board in this appeal.

STATUS OF CLAIMS

Claims 4 and 6-11 stand twice REJECTED under 35 U.S.C. § 103.

Claims 4 and 6-11 are APPEALED.

Claims 1-3 and 5 are CANCELLED.

The rejections of Claims 4 and 6-11 under 35 U.S.C. § 103 over Utecht (U.S. Patent 6,184,310, issued February 6, 2001) in view of Carr (US 2004/0250972 A1, published December 16, 2004), Takahata (U.S. Patent 3,933,558, issued January 20, 1976), Snow (U.S. Patent 5,830,318, issued November 3, 1998), and Koichi (JP09-217292, published August 19, 1997), as

evidenced by Lai (EP 0 331 047, published September 6, 1989) and Varveri (U.S. Patent 3,639,208, February 1, 1972), are APPEALED.

STATUS OF AMENDMENTS

No amendment to Claims 4 and 6-11 on appeal was submitted and/or entered after the Examiner's October 27, 2010, final rejection thereof. Finally rejected Claims 4 and 6-11 are reproduced in the Claims Appendix to this Appeal Brief.

SUMMARY OF CLAIMED SUBJECT MATTER

Applicant claims a method for producing paper having substantial amounts of uniformly dispersed particulate titanium dioxide and/or calcium carbonate filler and enhanced opacity, whiteness, ash content, and strength (Spec., p. 1, ll. 5-14; Claims Appendix, Claims 4 and 9). Persons having ordinary skill in the art knew well that the amounts of particulate titanium dioxide and/or calcium carbonate filler required to produce paper having excellent opacity and whiteness could not be retained in paper produced by conventional papermaking processes wherein filler-containing pulp slurry is deposited on a wire or screen and water is withdrawn from the paper without including a suitable retention aid in the filler-containing pulp slurry (Spec., pp. 1-2, bridging ¶). Particulate titanium dioxide and/or calcium carbonate filler presented unique problems due to its low particle diameter (Spec., p. 1, l. 31, to

p. 2, l. 5). Unretained amounts of added particulate titanium dioxide and/or calcium carbonate filler are either discarded or left to accumulate and contaminate the papermaking process and machinery (Spec., p. 2, l. 35, to p. 3, l. 2).

Persons having ordinary skill in the art also knew that the capacity to retain large amounts of uniformly dispersed fillers in paper produced by the conventional papermaking processes could be improved by adding effective amounts of retention-aiding polymers such as polyacrylamide resins, polyamideamine-epichlorohydrin resins, polyethyleneimine resins, etc. to the pulp slurry to improve dispersion, binding and fixing of the filler to the pulp fiber (Spec., p. 2, ll. 7-33). However, the large amounts of known retention aids conventionally added to the pulp slurry to retain particulate titanium dioxide and/or calcium carbonate filler generally resulted in coagulation and non-uniform distribution of the filler (Spec., p. 2, ll. 7-13).

Applicant solved the prior art papermaking problems associated with retaining large amounts of particulate titanium dioxide and/or calcium carbonate filler in paper produced by conventional papermaking processes by depositing an aqueous pulp slurry containing: (1) the pulp, (2) 0.0005-0.04 % (Spec., p. 14, l. 38, to p. 15, l. 6), based on the dry mass of the pulp, of a cationic polymer containing vinyl amine units prepared by hydrolyzing 20-100% of the formyl groups in a polymer containing N-vinylformamide units (Spec., p. 3, ll. 18-19; p. 12, ll. 5-15), and (3) particulate titanium dioxide and/or calcium carbonate

filler (Spec., p. 3, l. 21) in amounts such that the mass ratio of cationic polymer to the particulate titanium dioxide and/or calcium carbonate filler ranges from 0.001/100 to 0.5/100 (Spec., p. 3, l. 38, to p. 4, l. 7; p. 15, ll. 14-22) and the ash content of the paper produced by the process ranges from 3-40 wt% (Spec., p. 3, ll. 14-16; p. 15, ll. 6-12).

While the applied prior art recognized some of the problems which faced persons skilled in the art in their attempts to retain larger amounts of titanium dioxide and/or calcium carbonate filler, it does not provide adequate solutions to those problems or suggestions for solving those problems with any reasonable expectation of success. Thus, the Examiner's rejections of the problem-solving processes Applicant claims should be reversed.

GROUNDS OF REJECTION TO BE REVIEWED

The final rejections of Claims 4 and 6-11 under 35 U.S.C. § 103 over Utecht (U.S. Patent 6,184,310, issued February 6, 2001) in view of Carr (US 2004/0250972 A1, published December 16, 2004), Takahata (U.S. Patent 3,933,558, issued January 20, 1976), Snow (U.S. Patent 5,830,318, issued November 3, 1998), and Koichi (JP09-217292, published August 19, 1997), as evidenced by Lai (EP 0 331 047, published September 6, 1989) and Varveri (U.S. Patent 3,639,208, February 1, 1972), are APPEALED.

ARGUMENT

1. The Examiner erred rejecting Claims 4 and 6-11 under 35 U.S.C. § 103 in view of the combined teachings of Utecht and Lai

Preliminarily, Applicant shall focus on (1) the applied prior art considered by the Examiner to be closest to the claimed method (Utecht), and focus on (2) the applied prior art reference considered by Applicant to be closest to the claimed method (Lai), and. When considered in good light, the rejections of Applicant's claims reasonably should be reversed.

(A) Utecht (U.S. Patent 6,184,310, Issued February 6, 2001)

Utecht describes carbamate-functionalized polymers which have unique retention, drainage, and flocculation characteristics and the amounts thereof required to perform those functions. However, it would have been apparent to persons having ordinary skill in the art that Utecht's polymers and functional amounts differ from the polymers and amounts thereof required in Applicant's claimed processes.

Utecht acknowledges that "[p]olyvinylformamides which contain from 10 to 90% of vinylamine units have been used as retention, flocculation and drainage aids in papermaking and as flocculants for sludges (Utecht, col. 1, ll. 16-20). However, the invention Utecht discloses is not directed to polyvinylformamides polymers which contain from 10 to 90% of vinylamine units or their use as retention, flocculation and drainage aids in papermaking. Utecht expressly states (Utecht, col. 1, ll. 6-11; emphasis added):

> The present invention relates to a process for preparing addition polymers which contain carbamate units and to their use as retention, drainage and flocculation aids and as fixatives in paper-making, as protective colloids for the preparation of aqueous alkyldiketene dispersions and as dispersants for the preparation of aqueous filler slurries.

Utecht's invention relates to "carbamate-functionalized polyethylene-imines or [carbamate-functionalized] vinylamine polymers" (Utecht, col. 2, ll. 16-21; emphasis added). Polyvinylformamides polymers which contain from 10 to 90% of vinylamine units are merely Utecht's preferred starting materials (Utecht, col. 2, ll. 53-55).

Utecht's inventive polymers are the reaction products of vinylamine polymers and polyethyleneimines with haloformic esters having the formula: R-O-CO-X; where X is halogen (Utecht, col. 5, ll. 5-10). Utrecht's reaction products contain carbamate units having the following structures:

-NH-CO-OR or R-O-CO-N-CO-O-R (Utecht, col. 5, ll. 39-47).
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According to Utecht, at least 2 mol%, preferably from 5 to 10 mol%of the NH (amino) groups of Utecht's starting poly(N-vinylamine) polymers and copolymers are reacted with the haloformic acid (Utecht, col. 6, ll. 1-7). Moreover, Utecht instructs that all the NH groups of Utecht's starting poly(N-vinylamine) polymers and copolymers may be reacted with the haloformic acid (Utecht, col. 6, ll. 1-7). The Board should immediately recognize that Utecht's carbamate-functionalized polymers and copolymers are not the same polymers which are employed in Applicant's claimed process. As required by

Applicant's claims, the cationic polymer utilized as the retention aid in the claimed process is a polymer containing vinylamine units which is obtained "by 20 to 100% hydrolysis of the total formyl groups in a polymer having at least N-vinylformamide units as a polymerization component" (Claims Appendix, Claims 4 and 9). Thus, 20 to 100% of the formyl groups in Applicant's poly(N-vinylformamide) polymer are hydrolyzed to amino or NH groups to form Applicant's polymer containing vinylamine units. However, unlike Utecht's starting hydrolyzed poly(N-vinylformamide) polymer, none of the vinylamine units or $-CH_2-CH_2-NH$ units in Applicant's claimed polymer containing vinylamine units is carbamate-functionalized by reaction with a haloformic ester. The cationic polymer employed in Applicant's claimed method and the carbamate-functionalized polymer Utecht describes are significantly different.

Even assuming, however, that Utecht's carbamate-functionalized poly(N-vinylamine) polymers are retention aids which might be used to enhance retention of particulate titanium dioxide and/or calcium carbonate filler, Utecht's carbamate-functionalized poly(N-vinylamine) polymers are not added to pulp slurry in the relatively low amounts required by Applicant's claimed process. Utecht teaches away from adding its carbamate-functionalized polymers in the low effective amounts that Applicant's claimed cationic polymers containing vinylformamide and vinylamine units are added to a pulp slurry, i.e., in amounts no greater than 0.04% as Applicant's claims require (Claims Appendix, Claims 4 and 9).

Indeed, Utecht does teach that its carbamate-functionalized polymers are used as retention, drainage, and flocculation aids and also as fixatives in papermaking (Utecht, col. 6, ll. 56-58). "They are used in the customary amounts for this purpose" (Utecht, col. 6, ll. 59-60). In light of Lai's disclosure, however, the customary effective amounts of polymers containing vinylamine units for retention of titanium dioxide appear to be no less than 0.05 wt%, preferably no less than 0.1 wt% vinylamine polymer (Lai, p. 5, ll. 54-56). Consistent therewith, Utecht teaches (Utecht, col. 7, ll. 14-20; emphasis added):

> The carbamate-functionalized polymers are also useful as emulsifiers for preparing aqueous filler slurries which are used for example in the preparation of filled papers. Examples of suitable fillers are clay, chalk, titanium dioxide and kaolin. The quantities of emulsifier to prepare filler slurries range for example from 0.1 to 2, preferably from 0.5 to 1.5, % by weight, based on the aqueous slurry.

However, the Examiner totally disregards that portion of Utecht's disclosure relating to the preparation of titanium dioxide and calcium carbonate filled papers in favor of Utecht's seemingly inconsistent more general teaching that "retention, drainage, and flocculation aids are preferably used in papermaking amounts of 0.01 to 0.1% by weight, based on the dry fiber materials" (Utecht, col. 7, ll 2-4).

The problem with the Examiner's focus is that it is based on a very limited reading of Utecht's disclosure relating to the use of its carbamate-functionalized polymers as retention, drainage, and flocculation aids used in papermaking. Utecht's statement regarding the "retention, drainage and

flocculation aids are preferably used in papermaking amounts from 0.01 to 0.1% by weight, based on the dry fiber materials" (Utecht, col. 7, ll 2-4), taken in its proper context, has an entirely different meaning than that attributed to it by the Examiner. Utecht's teaching in its entirety reads as follows (Utecht, col. 6, l. 56, to col. 7, l. 13):

> The carbamate-functionalized polymers are used as retention, drainage and flocculation aids and also as fixatives in papermaking. They are used in the customary amounts for this purpose. They are especially useful as processing aids in the dewatering of paper stocks which contain contraries. Contraries are, for example, ligninsulfonates or other ingredients in wood and humic acids. The carbamate-functionalized polymers to be used according to the invention can be used for making all known paper, paperboard and cardboard grades. The papers can be produced from a multiplicity of different fiber materials, for example from sulfite or sulfate pulp in the bleached or unbleached state, groundwood, pressure groundwoods (PGW), CTMP or waste paper. The retention, drainage and flocculation aids are preferably used in papermaking amounts from 0.01 to 0.1% by weight, based on the dry fiber materials.
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> The carbamate-functionalized polymers additionally have a good fixing effect in such paper stocks as contain relatively large quantities of contraries; waste paper stocks, for example, contain contrary quantities of resins, polymeric binders and other contrary solids. To fix contraries on the fibers or in the paper, the carbamate-functionalized polymers, whether water-soluble or water-insoluble, are used for example in amounts from 0.001 to 0.1% by weight, based on dry paper stock.

The Board will note that the maximum amount of carbamate-functionalized polymers used to fix contraries in paper stocks containing contraries is 0.1% by weight, based on dry paper stock. On the other hand, when discussing the amount of carbamate-functionalized polymers useful "for preparing aqueous filler slurries which are used for example in the preparation of filled papers" (Utecht, col. 7, ll. 14-16) where the "fillers are clay, chalk, titanium dioxide and

kaolin" (Utecht, col. 7, ll. 17-18), Utecht expressly states (Utecht, col. 7, ll. 18-20):

> The quantities of emulsifier to prepare filler slurries range for example from 0.1 to 2, preferably from 0.5 to 1.5, % by weight, based on the aqueous slurry.

The latter statement requiring no less than 0.1 wt% of carbamate-functionalized vinylamine containing polymers is consistent with Lai's teaching that a minimum amount of 0.05 wt%, preferably a minimum amount of 0.1 wt%, of a poly(vinylamine) polymer is required to improve titanium dioxide retention in wood pulp (Lai, p. 8, ll. 49-50).

(B) Lai (EP 0 331 047, published September 6, 1989)

Lai would have taught persons having ordinary skill in the art that the method Applicant claims would not improve the retention of titanium dioxide or enhance the ash content and opacity of paper produced by conventional papermaking processes. Lai suggests to persons having ordinary skill in the art that Applicant's claimed method does not work because the content of vinylamine polymer in the cellulose fiber slurry is less than 0.05 wt%, based on the dry fiber content.

Lai teaches that hydrolyzed poly(N-vinylamides), especially hydrolyzed poly(N-vinyformamide), i.e., poly(vinylamine) and poly(vinylamine) salts, and copolymers of having N-vinylamide and 25 wt% of at least one other ethylenically unsaturated monomer, may by used to improve the retention of fillers such as titanium dioxide in paper produced by conventional papermaking

processes (Lai, p. 5, 18-49). However, Lai instructs (Lai, p. 5, ll. 50-57; emphasis added):

> With regard to the papermaking process, such process involves an aqueous cellulose fiber (wood pulp) suspension, which may contain one or more rosin size and mineral constituents (fillers) depending on the product desired, being deposited and drained on a continuous moving wire cloth. The free water passes and drops of the cellulose fiber web which undergoes further processing to yield the desired paper product. The addition of 0.05 to 0.5 wt%, preferably 0.1 to 0.2 wt%, vinylamine polymer, based on fiber, to the aqueous cellulose fiber slurry (et-end_ provides for an increase in the dry strength of the paper product and an increase in the retention of titanium dioxide in those papermaking processes that use TiO_2.

In Lai's Example 12, Lai allegedly tested four polymers at various concentrations for their capacities to retain titanium dioxide in paper made by a conventional papermaking process (Lai, p. 8, ll. 21-50). The "polymers were added to the fiber suspension . . . at addition levels of 0, 0.01, 0.05, 0.1, 0.2 and 1% based on fiber", the suspension was maintained at a pH of 5, and the paper product was tested for % TiO_2 Retention using a Tappi standard method (Lai, p. 8, ll.32-35). Lai reported the following results in Table 4 as follows:

Polymer	% TiO_2 Retention
VAm (7MM)	93.1
VAm (80 M)	83.3
PAM (2-4 MM)	85.6
PAM (<1 MM)	54.0

VAm (7MM) is a vinylamine homopolymer with a molecular weight of 7,000,000. VAm (80M) is a vinylamine homopolymer with a molecular weight of 80,000. PAM (2-4 MM) is a polyacrylamide polymer with a molecular

weight of 2,000,000-4,000,000. PAM (<1 MM) is a polyacrylamide polymer with a molecular weight of <1,000,000.

Lai concluded (Lai, p. 8, ll. 49-5), "It can be seen that the 7MM molecular weight poly(vinylamine) demonstrated a superior TiO_2 retention at 0.1-0.2% addition level to wood pulp." Moreover, Lai suggests that four times as much low molecular weight poly(vinylamine) polymer would be required to achieve the same effective dry strength in papermaking as the amount of high molecular weight poly(vinylamine) polymer (Lai, p. 8, ll. 14-16).

Taken as a whole, the combined prior art reasonably would have led persons having ordinary skill in the art to understand that no less than 0.05 wt%, preferably no less than 0.1 wt% based on the dry fiber, of poly(vinylamine) polymer is required to improve the retention and uniformity of retention of titanium dioxide and calcium carbonate filler by paper produced by conventional papermaking processes. Taken as a whole, the combined prior art reasonably would have led persons having ordinary skill in the art to understand that no less than 0.1 wt% of carbamate-functionalized poly(vinylamine) polymer is customarily used for preparing aqueous filler slurries used in the preparation of titanium dioxide and/o calcium carbonate filled paper produced by conventional papermaking processes. Lai's polymer is said to be no more effective for improving titanium dioxide retention in amounts less than 0.05 wt% than the addition of 0 wt% polymer or "without including the cationic

polymer in the pulp slurry" contrary to Applicant's claims (Claims Appendix, Claims 4 and 9).

Finally, as did the Examiner at pages 3-4, bridging paragraph, of the Advisory Action dated February 11, 2011 (AA), Applicant notes Utecht's teaching that the amount of carbamate-functionalized poly(vinylamine) emulsifier useful for preparing filler slurries when the filler is titanium dioxide ranges from 0.1 to 2% by weight, is "based on the aqueous slurry" (Utecht, col. 7, ll. 18-20). This means that the minimum percentage by weight of Utecht's carbamate-functionalized poly(vinylamine) emulsifier. based on the dry fiber, which is useful for preparing filler slurries in the preparation of filled papers when the filler is titanium dioxide or calcium carbonate is substantially greater than 0.1 % by weight, based on the dry fiber. Lai prefers to use 0.1-0.2 wt%, based on dry fiber, of its poly(vinylamine) polymer to improve titanium dioxide retention.

No combination of the teachings of Utecht and Lai would have led persons having ordinary skill in the art to the process Applicant claims with reasonable expectation of success as is required to sustain a rejection for obviousness under 35 U.S.C. § 103. *In re O'Farrell*, 853 F.2d 894, 903 (Fed. Cir. 1988).

Nevertheless, the Examiner argues that there is insubstantial experimental evidence in Lai to support a conclusion that no less than 0.05% of its poly(vinylamine) polymer is required to improve titanium dioxide filler

retention in paper made by conventional papermaking processes. The Examiner finds (AA, p. 2):

> The single example [Example 12] using a vinylamine containing polymer of unknown degree of hydrolysis and having a specific molecular weight cannot provide sufficient support that the claimed vinylamine polymer having any molecular weight and a broad range of degree of hydrolysis. Lai et al also does not use calcium carbonate, which is also a claimed filler.

Applicant is taken aback by the Examiner's comments. First, Lai is prior art cited and relied upon by the Examiner in support of the appealed rejection for obviousness. That Lai's conclusions appear to be supported solely by Example 12 which compares the % TiO_2 Retention for VAm (7MM) and VAm (80M) to conventional retention aids such as PAM(2-4MM) and PAM(<1MM) may affect the weight of the evidence but the conclusions persons having ordinary skill in the art prima facie would have drawn therefrom stands firm. Moreover, the evidence upon which Lai relies in support of its conclusion that no less than 0.1 wt% of poly(vinylamine) is required to improve titanium dioxide retention is infinitely more evidence than that which Utecht provides in support of its general conclusions.

Additionally, the Examiner questions the degree of hydrolysis of the 7MM and 80M poly(vinylamines) tested in Lai's Example 12. Again, Applicant is confused. Lai teaches (Lai, p. 8, l. 22; emphasis added), "This Example shows the retention characteristics of the vinylamine homopolymer in

papermaking." A vinylamine homopolymer is a poly(vinylformamide) polymer which is 100% hydrolyzed. There should be no confusion in that regard.

That Lai's experimental evidence is specific for titanium dioxide is immaterial to Claims 10-11 on appeal for which the filler is limited to titanium dioxide. The Examiner does not mention Claims 10-11. And, again Utecht provides no examples whatsoever. The fact is that Lai provides much more information relating to the molecular weights of the polymers compared in Example 12 than Utecht provides in its entire disclosure.

Persons skilled in the art rarely act in a manner inconsistent with prior art preferences, especially when there is no apparent reason to do so. Where, as here, Lai teaches away from Applicant's claimed method, non-obviousness is indicated. *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007). As the Federal Circuit said in *In re Peterson*, 315 F.3d 1325, 1330 (Fed. Cir. 2003), "The normal desire of scientists or artisans to improve upon what is already generally known . . . ." If the prior art reasonably would have suggested moving in another direction, nonobviousness is indicated. *KSR International Co. v. Teleflex Inc.*, 550 U.S. at 416.

2. The Examiner erred in rejecting Claims 4 and 6-11 under 35 U.S.C. § 103 over Utecht in view of Carr, Takahata, Snow, Koichi, Lai, and Varveri

Claims 4 and 6-11 stand finally rejected under 35 U.S.C. § 103 over Utecht in view of Carr, Takahata, Snow, Koichi, Lai, and Varveri. The rejections for obviousness are erroneous and should be reversed because Carr,

Takahata, Snow, Koichi, and Varveri do not remedy any of the deficiencies of Utecht and Lai.

To support a conclusion of obviousness, the prior art must suggest the process Applicant claims with reasonable expectation of success. In re O'Farrell, 853 F.2d 894, 903 (Fed. Cir. 1988); In re Dow Chemical Co., 837 F.2d 469, 473 (Fed. Cir. 1988); Merck & Co., v. Biochraft Laboratories, Inc., 874 F. 2d 804, 809 (Fed. Cir.1989).

As previously stated, Utecht teaching relates to the use of "carbamate-functionalized poly(vinylamines) as retention, drainage and flocculation aids and also as fixatives in papermaking (Utecht, col. 6, ll. 56-58). Utecht states (Utecht, col. 6, ll. 58-59; emphasis added), "They are used in the customary amounts for this purpose."

Lai teaches that hydrolyzed polymers prepared from N-vinylformamide monomers are conventionally used as retention aids for fillers such as titanium dioxide in papermaking methods in amounts ranging from "0.05 to 0.5 wt%, preferably 0.1 to 0.2 wt%, . . . based on fiber" (Lai, p. 5, ll. 50-56; p. 9, Claims 1-15). Lai would have taught persons having ordinary skill in the art that poly(vinylamine) polymers are not effective as retention aids for fillers such as titanium dioxide in amounts less than 0.05 wt% (Lai, p. 8, Example 12, ll. 49-50).

The Examiner erroneously attempted to either limit consideration of Lai's teaching or discredit it as archaic (Office Action dated October 27, 2010 (OA), p.2, ¶ 3):

> Lai . . . was only used for evidence that acid hydrolyzed polymers prepared from N-vinylformamide monomers are cationic. In addition, Utecht . . . postdates Lai . . . by a decade and has realized that lower amounts of such polymers can be used effectively for retention and drainage.

However, prior art must be considered for everything it would have taught by way of technology. EWP Corp. v. Reliance Universal Inc., 755 F.2d at 907. It is improper for the Examiner to dismiss any part of a reference's pertinent disclosure. Lai teaches that hydrolyzed polymers prepared from N-vinylformamide monomers are conventionally used as retention aids for fillers such as titanium dioxide in papermaking methods in amounts ranging from "0.05 to 0.5 wt%, preferably 0.1 to 0.2 wt%, . . . based on fiber" (Lai, p. 5, ll. 50-56; p. 9, Claims 1-15; and p. 8, Example 12, ll. 49-50). That teaching and the support therefore, however limited, cannot be summarily dismissed or disregarded. Persons having ordinary skill in the art reasonably would look for evidence which contradicts Lai's teaching. On this record, none can be found.

Having summarily dismissed material portions of the evidence of record, the Examiner finds that Utecht generally teaches using any polymers having amine-containing units as retention and drainage aids and as fixatives for fillers such as titanium dioxide for making all known paper, paperboard and cardboard grades in amounts from 0.01% to 0.1% by weight, based on the dry fiber.

Utecht teaches nothing of the kind. As previously stated, all Utecht's polymers are carbamate-functionalized. Applicant's polymers are not carbamate-functionalized. Applicant's claimed process utilizes a 20-100% hydrolyzed poly(formamide), i.e., a polymer having vinylformamide and vinylamine units. Again, the vinylamine units in Applicant's retention polymers are not carbamate-functionalized. Moreover, Applicant's retained filler is titanium dioxide or chalk. Utecht requires at least 0.1 wt% of its carbamate-functionalized polymers to prepare aqueous filler slurries which are used in the preparation of papers filled with titanium dioxide or chalk.

The Examiner relies upon Carr and Varveri only for their teachings that retention aids are conventionally employed in papermaking processes "to increase the adsorption of fillers onto cellulosic fibers or to bind cellulosic fibers" (OA, p. 3, 1st full ¶; p. 5,), "to increase adsorption of fine particles" (AA, pp. 5-6, bridging ¶), and "to bind the filler to the cellulose fibers" (AA, pp. 5-6, bridging ¶). Applicant most certainly agree. However, Applicant's claimed process is sifnificantly more limited. Applicant believes persons having ordinary skill in the art would have been shocked by the extreme facility with which the Examiner generally equates concepts of adsorption and binding and generally equates various kinds of fillers and carries and the amounts thereof while Utecht devotes separate paragraphs to the various amounts of carbamate-functionalized poly(vinylamine) polymers required for dewatering, fixing, and emulsifying carries and the various distinct amounts of carbamate-

functionalized poly(vinylamine) polymers required for dewatering, fixing, and emulsifying mineral fillers such as titanium dioxide and calcium carbonate. It appears that the Examiner's hindsight reconstruction of Applicant's claims attempts to eliminate all the art-recognized distinctions.

The Examiner previously relied upon the teachings of Takahata, Snow, and Koichi to establish that high opacity, high ash content papers are well-known in the art (OA, p. 5, 3rd ¶, to p. 6, l. 10). Again, Applicant agrees. However, none of the teachings of Carr, Varveri, Takahata, Snow, and Koichi remedy the deficiencies of Utecht or suggest that Lai's disclosure would have been discredited as meaningless and entitled to no evidentiary weight as the Examiner would have this Board understand.

> In the final analysis, Lai teaches (Lai, p. 8, ll 32-50):
>
> [T]he polymers were added to the fiber suspension at 0.5% consistency at addition levels of 0, 0.01, 0.05, 0.1, 0.2 and 1% based on fiber. . . . Hand sheets prepared in the manner described were conditioned at 50% RH and 73°F and test[ed] for filler retention using TAPPI standard method.
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> . . . . .
>
> It can be seen that 7MM molecular weight poly(vinylamine) demonstrated a superior TiO_2 retention at 0.1-0.2% addition level to wood pulp.

Lai also instructs (Lai, p. 5, ll. 54-56):

> The addition of 0.05 to 0.5 wt%, preferably 0.1 to 0.2 wt%, vinylamine polymer, based on fiber, to the aqueous cellulose fiber slurry (wet-end) provides for an increase in the dry strength of the paper product and an increase in the retention of titanium dioxide in those papermaking processes that use TiO_2.

Thus, objective evidence of record shows, contrary to the Examiner's previous findings, that fixing titanium dioxide fillers to the fibers in a pulp slurry is NOT an inherent function in the use of any cationic polymer having vinylamine units as a retention aid, and also shows, contrary to the Examiner's conclusion, that fixing titanium dioxide and comparable fillers to pulp fibers would NOT have been obvious to one of ordinary skill in the art with full knowledge of the applied prior art. "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'" In re Robertson, 169 F.3d 743, 745 (Fed. Cir. 1999)(citations omitted).

The Board reasonably might ask why Applicant's claimed method "enhances the ash content and opacity of the filler-containing paper produced relative to the ash content and opacity of the filler-containing paper produced without including the cationic polymer in the pulp slurry" and yet Lai could not achieve improved TiO_2 retention in its experiments utilizing less than 0.05 wt% poly(vinylamine) homopolymer. Applicant can only speculate, and patentability should never be awarded or denied based on speculation. *In re Steele*, 305 F.2d 859, 862 (CCPA 1962).

It should suffice to say that persons having ordinary skill in the art would have learned from Lai's disclosure, well supported or minimally supported, that the process Applicant claims does not work. To support a rejection for anticipation under 35 U.S.C. § 102 or obviousness under 35 U.S.C. § 103, the prior art must enable one skilled in the art to make and use the claimed process with reasonable expectation of success. *Impax Laboratories, Inc. v. Aventis Pharmaceuticals Inc.*, 545 F.3d 1312, 1314 (Fed. Cir. 2008); *In re Hoeksema*, 399 F.2d 269, 274 (CCPA 1968). In light of Lai's ineffectual disclosure, persons having ordinary skill in the art reasonably would not expect any success using the method Applicant claims without undue experimentation. Obvious to try has long been held not to constitute obviousness. *In re Deuel*, 51 F.3d 1552, 1559 (Fed. Cir. 1995).

Utecht mentions fillers such as chalk (calcium carbonate) and titanium dioxide only when discussing the preparation of filler slurries which are used in the preparation of filled papers (Utecht, col. 7, ll. 14-20). Utecht then adds carbamate-functionalized polymers having vinylamine units in amounts from 0.1 to 2% by weight, preferably 0.5 to 1.5 %, based on the weight of the aqueous slurry. Utecht expressly states (Utecht, col. 7, ll. 14-20; emphasis added):

> The carbamate-functionalized polymers are also useful as emulsifiers for preparing aqueous filler slurries which are used for example in the preparation of filled papers. Examples of suitable fillers are clay, chalk, titanium dioxide and kaolin. The quantities of emulsifier

> to prepare filler slurries range for example from 0.1 to 2, preferably from 0.5 to 1.5, % by weight, based on the aqueous slurry.

Persons having ordinary skill in the art would immediately recognize that 0.1 to 2 % by weight, based on the aqueous slurry, is a much higher percentage than Lai's 0.1 wt%, based on total solids concentration. Persons having ordinary skill in the art reasonably would have expected that the disclosed fixing effects of Utecht's carbamate-functionalized polymers in the specified amounts of from 0.001 to 0.1 % by weight, based on dry paper stock relate to fixing "contraries" in papermaking processes for making paper stocks containing large quantities of "contraries". Those effective amounts are not applicable to fixing fillers such as titanium dioxide and chalk in papers containing large quantities thereof. Lai would most likely either concur or obstain. In short, Utecht does not teach that its carbamate-functionalized polymers are useful for generally for fixing particulate fillers to pulp fibers in amounts from 0.001-0.1% by weight based on dry paper stock. Rather, Utecht teaches that carbamate-functionalized polymers are useful "in the customary amounts" as retention, drainage and flocculation aids and also as fixatives in papermaking, i.e., in amounts no less than 0.05 wt% in accordance with Lai's teaching. Consistent therewith, Utecht teaches that its carbamate-functionalized polymers are useful for preparing aqueous filler slurries for preparing filled papers in amounts no less than 0.1, preferably no less than 0.5 % by weight, based on the aqueous slurry.

The method Applicant claims (Claims 4 and 9) requires:

fixing a particulate filler of titanium dioxide and/or calcium carbonate to pulp fibers using 0.0005-0.04%, preferably from 0.001-0.04%, by weight based on dry paper stock of a cationic polymer containing N-vinylformamide units which are 20-100% hydrolyzed; wherein the mass ratio of the cationic polymer to particulate filler ranges from 0.001/100 to 0.5/100 by conversion to solids concentration and the ash content and opacity of the filler-containing paper produced is enhanced relative to the ash content and opacity of the filler-containing paper produced without including the cationic polymer in the pulp slurry. The greater weight of the evidence of record supports the conclusion that Applicant's claimed processes are patentable over the applied prior art.

A contrary conclusion of obviousness minimally requires some teaching, suggestion, or motivation to do what Applicant has done with reasonable expectation of success. In re O'Farrell, 853 F.2d 894, 903 (Fed. Cir. 1988). See also KSR International Co. v. Teleflex Inc., 550 U.S. 398, 418-419 (2007)("[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does."). The teaching away in this case is a strong indicator of nonobviousness. KSR International Co. v. Teleflex Inc., 550 U.S. 398, 416 (2007).

In light of the combined teachings of the prior art applied against Applicant's claimed process, the enhanced filler retention, ash content, opacity, and strength achieved by the process Applicant claims reasonably could not

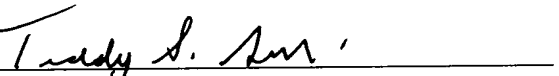
have been predicted. Rather, persons having ordinary skill in the art would have been flabbergasted that Applicant attempted to do what the prior art suggested was an exercise in futility. Persons skilled in the art are not normally moved to optimize in a direction opposite to that recommended by the prior art. *In re Peterson*, 315 F.3d 1325, 1330 (Fed. Cir. 2003).

Therefore, for the reasons stated herein:

The final rejections of Claims 4 and 6-11 under 35 U.S.C. § 103 over Utecht in view of Carr, Takahata, Snow, Koichi, Lai, and Varveri for obviousness are erroneous and should be reversed.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, L.L.P.



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CLAIMS APPENDIX

Claims 1-3 (Canceled).

Claim 4 (Rejected): A method for the production of filler-containing paper, comprising:

depositing a pulp slurry consisting essentially of pulp fibre, a cationic polymer containing vinylamine units and a particulate filler (B) of titanium dioxide and/or calcium carbonate on a substrate; and

dewatering the applied pulp thereby fixing the cationic polymer and filler particles to the fibers of the pulp such that the paper product prepared has an ash content of 3-40 wt %,

wherein the cationic polymer component is defined in terms of a component (A) which comprises at least 0.0005 %, but no more than 0.04 %, by conversion to solids concentration in terms of the dry mass of raw material pulp, of a polymer obtained by 20 to 100 % hydrolysis of the total formyl groups in a polymer having at least N-vinylformamide units as a polymerization component;

wherein component (A) and component (B) are added to the pulp slurry such that the mass ratio of component (A) to component (B) ranges from 0.001/100 to 0.5/100 by conversion to solids concentration; and

whereby the cationic polymer fixes the titanium dioxide and/or calcium carbonate filler particles to the fibers of the pulp and thereby enhances the ash

content and opacity of the filler-containing paper produced relative to the ash content and opacity of the filler-containing paper produced without including the cationic polymer in the pulp slurry.

Claim 5 (Cancelled).

Claim 6 (Rejected): The method for the production of filler-containing paper according to Claim 4, wherein in the preparation of component (A), N-vinylformamide is copolymerized with a monomer selected from the group consisting of the vinyl or propenyl esters of saturated carboxylic acids, nonionic (meth)allyl monomers, (meth)allyl monomers having a side chain which contains a cationic nitrogen atom, olefins, ethylenically-unsaturated carboxylic acids, esters or amides of these ethylenically-unsaturated carboxylic acids, monomers with a nitrile group, monomers with a sulphonic acid group, monomers with a phosphoric acid group and styrene-type monomers.

Claim 7 (Rejected): The method for the production of filler-containing paper according to Claim 4, wherein said pulp is a kraft pulp, a sulphite pulp, other such bleached and unbleached chemical pulps, groundwood pulp, mechanical pulp, thermomechanical pulp, chemithermomechanical pulp, other such bleached or unbleached high-yield pulps, waste pulps, wood pulp, straw

pulp, kenaf pulp and mixtures of one of said aforesaid pulps and a synthetic polyamide, polyester, polyolefin or polyvinyl alcohol fibre.

Claim 8 (Rejected): A base paper of the filler-containing paper produced according to the method of Claim 4 in the form of a construction material, India paper or tip base paper for cigarettes.

Claim 9 (Rejected): The method for the production of filler-containing paper, comprising:

depositing a pulp slurry consisting essentially of pulp fibre, a cationic polymer containing vinylamine units and a particulate filler (B) of titanium dioxide and/or calcium carbonate on a substrate; and

dewatering the applied pulp thereby fixing the cationic polymer and filler particles to the fibers of the pulp such that the paper product prepared has an ash content of 3-40 wt %,

wherein the cationic polymer component is defined in terms of a component (A) which comprises at least 0.001 %, but no more than 0.04 %, by conversion to solids concentration in terms of the dry mass of raw material pulp, of a polymer obtained by 20 to 100 % hydrolysis of the total formyl groups in a polymer having at least N-vinylformamide units as a polymerization component;

wherein component (A) and component (B) are added to the pulp slurry such that the mass ratio of component (A) to component (B) ranges from 0.01/100 to 0.3/100 by conversion to solids concentration; and

whereby the cationic polymer fixes the titanium dioxide and/or calcium carbonate filler particles to the fibers of the pulp and thereby enhances the ash content and opacity of the filler-containing paper produced relative to the ash content and opacity of the filler-containing paper produced without including the cationic polymer in the pulp slurry.

Claim 10 (Rejected): The method for the production of filler-containing paper according to Claim 4, wherein particulate filler (B) is titanium dioxide.

Claim 11 (Rejected): The method for the production of filler-containing paper according to Claim 9, wherein particulate filler (B) is titanium dioxide.

EVIDENCE APPENDIX

Affidavits and Declarations

No secondary evidence in the form of an affidavit or declaration is relied upon in support of the findings and arguments in this appeal.

Other Evidence

No other evidence in the form of an affidavit or declaration is relied upon in support of the findings and arguments in this appeal.

RELATED PROCEEDINGS APPENDIX

Appellant/Applicant, Appellant/Applicant's legal representative[s], and Appellant/Applicant's assignee[s], are aware of no appeals, interferences, or judicial proceedings that are related to, directly affect or would be directly affected by, or have a bearing on the decision of the Board of Patent Appeals and Interferences.